

TABLE 1.—Mean free-air temperatures and relative humidities obtained by airplanes during October 1936—Continued

LATE REPORT FOR SEPTEMBER, 1936

TEMPERATURE (°C.)

Stations	Altitude (meters) m. s. l.																		
	Surface		500		1,000		1,500		2,000		2,500		3,000		4,000		5,000		Number of obser- vations
	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	
Pearl Harbor, Territory of Hawaii ³ (6 m.)	23.4	-2.3	21.9	-0.4	18.3	-0.1	15.3	-0.1	13.3	+0.5	12.0	+0.8	9.7	+0.5	3.6	+0.1	-1.8	-0.2	30

RELATIVE HUMIDITY (PERCENT)

Pearl Harbor, Territory of Hawaii	84	+9	80	+3	84	+3	78	+2	69	0	52	-1	43	+2	33	0	11	-12	-----
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³ Navy.

NOTE.—The departures are based on normals covering the following total number of observations made during the same month in previous years, including the current month (years of record are given in parentheses following the number of observations): Pearl Harbor, 154 (8). The observations are taken at dawn.

TABLE 2.—Free-air resultant winds (meters per second) based on pilot-balloon observations made near 5 a. m. (E. S. T.) during October 1936

[Wind from N=360°, E=90°, etc.]

Altitude (m) m. s. l.	Albuquerque, N. Mex. (1,554 m)		Atlanta, Ga. (309 m)		Billings, Mont. (1,088 m)		Boston, Mass. (15 m)		Cheyenne, Wyo. (1,373 m)		Chicago, Ill. (192 m)		Cincinnati, Ohio (153 m)		Detroit, Mich. (204 m)		Fargo, N. Dak. (274 m)		Houston, Tex. (21 m)		Key West, Fla. (11 m)		Medford, Oreg. (410 m)		Murfreesboro, Tenn. (180 m)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
Surface	356	1.9	356	1.2	259	2.9	253	1.6	294	3.2	243	1.1	257	0.4	240	1.8	285	0.9	13	1.3	62	1.9	168	0.6	172	0.8
500	32	2.9	32	2.9	256	7.3	256	7.3	253	5.3	253	5.3	241	4.3	256	5.5	286	2.6	106	1.1	74	3.12	221	.1	194	3.6
1,000	3	2.2	3	2.2	264	8.2	264	8.2	256	5.7	256	5.7	258	5.9	262	7.7	301	5.3	131	.3	94	2.7	215	.4	208	5.1
1,500	314	2.2	314	2.2	253	5.4	274	8.5	263	5.6	263	5.6	249	6.2	262	9.8	294	6.0	289	1.3	93	1.9	92	1.7	240	4.4
2,000	223	.8	283	4.8	286	5.6	284	8.8	294	5.1	275	9.6	259	9.0	259	11.4	291	10.1	277	2.9	94	1.4	61	3.7	253	4.0
2,500	226	3.1	273	6.0	296	5.5	288	10.8	299	7.0	270	12.6	265	8.7	265	11.1	287	8.8	290	3.3	84	1.5	31	3.9	271	5.1
3,000	259	4.6	263	5.4	299	7.7	---	---	311	7.6	283	11.5	246	7.4	255	9.9	298	9.2	306	4.2	92	1.5	32	5.2	275	3.8
4,000	253	6.2	276	5.4	303	9.8	---	---	303	8.1	---	---	---	---	264	10.8	---	---	257	6.1	281	1.1	344	4.7	224	4.9
5,000	276	8.0	---	---	---	---	---	---	296	5.7	---	---	---	---	---	---	---	---	288	5.2	---	---	346	5.1	---	---

Altitude (m) m. s. l.	Newark, N. J. (14 m)		Oakland, Calif. (8 m)		Oklahoma City, Okla. (402 m)		Omaha, Nebr. (306 m)		Pearl Harbor, Territory of Hawaii ¹ (68 m)		Pensacola, Fla. ¹ (24 m)		St. Louis, Mo. (170 m)		Salt Lake City, Utah (1,294 m)		San Diego, Calif. (15 m)		Sault Ste. Marie, Mich. (198 m)		Seattle, Wash. (14 m)		Spokane, Wash. (603 m)		Washington, D. C. (10 m)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
Surface	312	1.4	305	0.1	182	0.9	300	0.3	40	1.8	33	4.3	205	1.1	144	3.0	261	0.1	325	0.5	130	0.9	88	1.2	297	0.5
500	254	5.4	351	1.0	197	4.6	253	1.9	90	3.9	73	4.5	239	5.3	---	---	256	1.1	263	2.6	50	.6	---	---	258	2.8
1,000	273	6.7	22	2.9	232	5.8	273	4.1	87	4.2	56	.8	261	7.3	---	---	311	7	272	7.5	201	1.8	233	.8	266	4.0
1,500	280	8.4	44	2.8	250	4.6	284	6.3	81	1.9	250	1.5	263	6.3	144	2.7	186	1.0	278	10.5	270	1.4	267	2.6	271	5.9
2,000	275	9.3	96	1.7	263	4.1	286	7.9	94	1.2	246	2.6	264	7.0	180	.5	94	1.6	274	10.6	206	1.5	285	3.8	276	7.2
2,500	289	9.9	20	1.8	262	3.6	284	8.9	88	1.9	252	3.4	278	7.3	235	1.1	70	1.8	292	12.1	323	1.7	293	5.8	271	7.2
3,000	---	---	351	3.5	275	4.2	279	8.8	92	2.5	269	4.0	277	8.4	259	1.3	6	3.4	284	13.4	323	3.1	294	6.4	257	9.5
4,000	---	---	---	---	284	3.7	273	8.7	26	1.6	284	4.5	265	9.1	327	2.0	337	4.2	---	---	---	---	289	7.0	---	---
5,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	326	4.3	---	---	---	---	---	---	---	---	---	---

¹ Navy stations.

RIVERS AND FLOODS

[River and Flood Division, MONTROSE W. HAYES, in charge]

By BENNETT SWENSON

The floods of late September in the rivers in south-eastern Texas continued into October. The Trinity River overflowed portions of Anderson and Leon Counties, causing property losses of approximately \$21,500, but in the lower reaches flood stages were only slightly exceeded. The flood in the Brazos reached Valley Junction, Tex., on the 1st with a crest 3.6 feet above flood stage. Thereafter there was a rapid flattening out of flood water. Damage was confined principally to Washington and Robertson Counties where property (mostly

matured crops) valued at \$191,000, was destroyed. Although high stages occurred in the lower reaches of the Colorado, Guadalupe, and the Rio Grande Rivers the losses were relatively light because matured crops were mostly harvested, and highways damaged by an earlier flood were mostly unrepaired. Some flooding also continued in the Saluda, Santee, and Savannah drainage basins in South Carolina and Georgia with minor losses mostly to crops and livestock.

Rains set in on the 6th of the month and continued over much of the region east of the Mississippi River and also in Texas, becoming moderately heavy over the middle Mississippi Valley, the Ohio Valley, and the Atlantic States on the 9th, ending on the night of the 10th. Rains began again on the 15th in the Southeastern States, being moderately heavy over Virginia, the Carolinas, and Georgia, especially in the mountains, ending on the 17th.

On the 22d and 23d moderate rains occurred in the lower Ohio Valley, Arkansas, Oklahoma, and Texas, continuing in Texas until the 25th. Rather general rains occurred over the eastern half of the country on the 26th.

This series of rains caused distinct periods of floods in some sections of the country; and in other sections, especially in the Santee Basin, the river was above flood stage practically the entire month, and during a large portion of the month in the Saluda and Savannah drainage basins. Comparatively little property damage resulted from the floods in the Santee, Saluda, and Savannah Basins; however, the suspension of the logging industry in the vicinity of Rimini, S. C., on the Santee River, amounted to a wage loss of \$16,700. Other rivers with one or more periods of floods during the month are as follows: James in vicinity of Columbia, Va., Neuse and Cape Fear in North Carolina, Peedee in South Carolina, Apalachicola in Florida, French Broad and tributaries in North Carolina, and Tennessee, minor tributaries of the Arkansas in Oklahoma and Arkansas, Sulphur in Texas, St. Francis in Missouri, Trinity and Colorado in Texas.

On the 16th and 17th a disastrous flood occurred in the upper reaches of the French Broad and tributaries, and the Broad and Catawba Rivers in North Carolina. Principal damage was to highways and bridges, estimated at \$27,000. The high water was due to exceptionally heavy precipitation which fell in the mountains of western North Carolina. The following was reported from Asheville, N. C.:

Heaviest damage was along tributaries in Madison and Buncombe Counties; Henderson and Transylvania Counties suffered only slight damage. Rainfall for the storm averaged somewhat less than 3 inches at Hot Springs, Marshall, and Asheville (Madison and Buncombe Counties) and 3 to 4 inches at Hendersonville, Brevard, and Rosman (Henderson and Transylvania Counties). Precipitation usually averages 50 to 100 percent higher in the upstream counties than in the downstream area. The explanation, however, of the greater overflow and damage in Buncombe and Madison Counties may, perhaps, be found in such amounts as 8.69 inches at Point Lookout, a fire-weather substation near the crest of the Blue Ridge about 20 miles east of Asheville, and 8.63 inches at Mount Mitchell. These exceptionally large amounts from points just outside the eastern boundary of the drainage area of this French Broad district, most of which fell in 24 hours, should throw some light on the damage done along the upper reaches of the Broad, Catawba, and Nolichucky Rivers. The Cane and South Toe, tributaries of the Nolichucky, caused considerable damage; they drain either side of Mount Mitchell. Point Lookout, incidentally, is near Swannanoa Gap and has an elevation of only about 2,400 feet while Mount Mitchell rises to 6,684 feet above mean sea level.

Table of flood stages during October 1936

[All dates in October unless otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
ATLANTIC SLOPE DRAINAGE					
	<i>Feet</i>			<i>Feet</i>	
James: Columbia, Va.....	10	17	19	15.1	18
Neuse:					
Smithfield, N. C.....	13	11	11	14.4	11
Goldsboro, N. C.....	13	4	5	13.2	5
Kinston, N. C.....	13	14	15	13.4	15
	13	17	18	13.4	17

Table of flood stages during October 1936—Continued

[All dates in October unless otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
	<i>Feet</i>			<i>Feet</i>	
Cape Fear: Look No. 2, Elizabethtown, N. C.....	20	11	12	21.8	11
Peedee:					
Cheraw, S. C.....	30	10	10	33.6	10
Mars Bluff Bridge, S. C.....	17	12	15	33.5	19
Poston, S. C.....	18	19	26	17.9	14
Saluda:		24	28	19.7	23
Pelzer, S. C.....	6	Sept. 30	2	18.9	26
Chappells, S. C.....	15	8	12	13.5	Sept. 30
Broad: Blairs, S. C.....	14	17	18	11.0	10
Congaree: Columbia, S. C.....	19	2	3	6.3	17, 18
Catawba:				17.6	3
Catawba, N. C.....	8	9	13	18.1	12
Catawba, S. C.....	11	17	17	18.7	18
Wateree: Camden, S. C.....	23	1	1	15.2	1
Santee:				18.4	10
Rimini, S. C.....	12	9	11	24.0	18
Ferguson, S. C.....	12	17	19	20.6	19
Broad: Carlton, Ga.....	15	Sept. 30	9	16.7	17
Savannah:				11.0	10
Calhoun Falls, S. C.....	8	1	1	13.6	18
Ellenton, S. C.....	14	2	8	22.8	19
Clyo, Ga.....	13	Sept. 30	10	17.6	22
EAST GULF OF MEXICO DRAINAGE					
Apalachicola: Blountstown, Fla.....	15	10	14	14.0	23, 24
MISSISSIPPI SYSTEM					
Ohio Basin					
Pigeon: Newport, Tenn.....	6	16	17	24.7	1
Nolichucky: Embreeville, Tenn.....	8	16	16	16.4	10
French Broad:					
Oldtown (near Newport, Tenn.).....	6	16	18	9.0	1
Dandridge, Tenn.....	12	17	17	21.2	4
Asheville, N. C.....	6	9	10	23.5	13
Arkansas Basin					
Verdigris: Sageyah, Okla.....	35	10	2	16.3	19
Poteau: Poteau, Okla.....	21	26	28	14.0	11, 12
Petit Jean: Danville, Ark.....	20	28	28	16.6	18
Red Basin					
Sulphur: Ringo Crossing, Tex.....	20	24	24	20.0	24
Lower Mississippi Basin					
St. Francis: Fisk, Mo.....	20	11	11	23.1	26
WEST GULF OF MEXICO DRAINAGE					
Elm Fork: Carrollton, Tex.....	6	Sept. 28	1	20.3	11
Trinity:					
Dallas, Tex.....	28	Sept. 27	2	9.4	Sept. 28
Trinidad, Tex.....	28	26	27	7.1	29
Long Lake, Tex.....	40	Sept. 29	10	26	26
Liberty, Tex.....	24	30	2	35.2	Sept. 28
Brazos: Valley Junction, Tex.....	44	Nov. 10	36.0	29.4	27
Colorado:				28.7	1
Marble Falls, Tex.....	21	Sept. 30	1	43.5	5
Mud, Tex.....	25	18	24.1	24.1	16, 17
Austin, Tex.....	21	1	47.6	47.6	1
Columbus, Tex.....	24	Sept. 29	5	28.0	Sept. 27
Wharton, Tex.....	26	Sept. 19	7	28.5	2
Guadalupe:				20.6	3
Gonzales, Tex.....	20	Sept. 29	1	35.4	1
Victoria, Tex.....	21	1	5	36.9	3
Rio Grande:					
Mercedes, Tex.....	21	2	2	29.9	Sept. 30
Brownsville, Tex.....	18	Sept. 29	5	28.7	

¹ Continued into November.

² Estimated.